

Reaction of detached fruits of chilli (*Capsicum annuum* L.) varieties to isolates of *Colletotrichum capsici* (Syd.) Butler and Bisby

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Received 13 December 2004; Revised 28 February 2005; Accepted 30 April 2005

Abstract

Investigations on the pathogenic potential of nine isolates of *Colletotrichum capsici* on four chilli (*Capsicum annuum*) varieties revealed variations in their incubation period and lesion size induced on inoculated fruits. The isolates CC-1, CC-2, CC-3, CC-4, CC-5 and CC-7 gave resistant reaction in all the four varieties. Isolate CC-9 gave susceptible reaction in all the four varieties. Isolate CC-8 induced susceptible reaction in Hisar Shakti and resistant reaction in Hisar Vijay whereas, CC-6 gave susceptible reaction in Hisar Vijay and resistant reaction in Hisar Shakti.

Key words: *Capsicum annuum*, chilli, *Colletotrichum capsici*, fruit rot.

Fruit rot caused by *Colletotrichum capsici* (Syd.) Butler and Bisby is one of the most destructive diseases of chilli (*Capsicum annuum* L.) (Bansal & Grover 1969; Sujathabai 1992; Datar 1995). The disease usually occurs on mature fruits in the field and may continue even during drying and storage. Many new varieties of chilli have lost their resistance after some years of extensive cultivation due to the appearance of new races of *C. capsici* in nature. Hence, the reaction of four varieties of chilli to nine isolates of *C. capsici* obtained from different cultivars and locations of Haryana was studied at CCS Haryana Agricultural University, Hisar (Haryana).

Fruits of chilli having symptoms of fruit rot caused by *C. capsici* were collected from important chilli growing districts of Haryana (Table 1). The organism was isolated and

purified by single spore isolation method.

Ripe fruits were collected from 105 days old plants of four varieties namely, Sadabahar, Hisar Vijay, Hisar Shakti and local hybrid (Kiran) from the field. The fruit surface was sterilized with absolute alcohol, washed with sterile distilled water and inoculated with spore suspension (3×10^4 spores ml⁻¹) by pin prick method (Muthulakshmi 1990). Five replications with five fruits each were maintained for each isolate. The inoculated fruits were incubated at $28 \pm 1^\circ\text{C}$ and about 100% RH for 15 days. The percentage of diseased area of the fruits was determined. The total area of healthy fruits was calculated using the formula: $25 \pi r l_1 + \pi r l_2$ where, r=radius of fruit near petiole; l_1 =length of fruit in upper cylinder-like part and l_2 =length of cone-like lower portion.

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Table 1. Collection of various isolates of *Colletotrichum capsici* from different locations of Haryana

Isolate	Chilli variety	Location
CC-1	Sadabahar	Gurgaon
CC-2	Pusa Jawala	Karnal
CC-3	Kiran	Jind
CC-4	Local	Rohtak
CC-5	Local	Bhiwani
CC-6	Hisar Vijay	Hisar
CC-7	C-142	Panipat
CC-8	CH-1	Fatehabad (Tohana)
CC-9	Hiramoti	Hisar (Hansi)

The disease severity caused by each isolate was rated on 0–5 point scale (Jeyalakshmi 1998). The disease ratings were then categorized into disease reaction on the basis of following scale:

Disease grade	Disease reaction
0.0–1.0	Resistant (R)
1.1–2.0	Moderately resistant (R ⁺)
2.1–3.0	Moderately susceptible (S ['])
3.1–4.0	Susceptible (S)
4.1–5.0	Highly susceptible (S ⁺)

The isolates were grouped into resistant (R, R⁺) and susceptible (S['], S, S⁺) categories to further distinguish the isolates clearly.

The isolates CC-1, CC-2, CC-3, CC-7, CC-8 and CC-9 had an incubation period of 10–12 days on all the varieties (Table 2) and in the remaining isolates it varied from 13 to 15 days. Isolate CC-9 produced maximum size of lesion with an average length of 2.80 cm in fruits of all varieties and in the remaining isolates it varied from 0.63 cm to 1.91 cm (Table 2). The data on disease grade and disease reaction indicated differential interaction between host genotype and isolates of the pathogen (Table 2). Isolate CC-9 was distinct from the remaining isolates as it gave susceptible reaction in all the four varieties. Isolate CC-8 and CC-6 could be differentiated on the basis of their pathogenic behaviour. Isolate CC-8 induced susceptible reaction in varieties Sadabahar, Hisar Shakti and Kiran and resistant reaction in Hisar

Table 2. Reaction of chilli fruits to *Colletotrichum capsici* isolates

Isolate	Lesion size (cm)* and incubation period (days)				Disease grade and reaction			
	Sadabahar	Hisar Vijay	Hisar Shakti	Kiran	Sadabahar	Hisar Vijay	Hisar Shakti	Kiran
CC-1	1.53x0.53 (12)**	0.96x0.30 (12)	1.36x0.40 (12)	1.90x0.50 (12)	2.00 (R ⁺)	1.00 (R)	2.00 (R ⁺)	2.00 (R ⁺)
CC-2	1.06x0.56 (12)	0.70x0.33 (10)	1.66x0.43 (12)	0.63x0.40 (12)	2.00 (R ⁺)	1.00 (R)	2.00 (R ⁺)	1.00 (R)
CC-3	1.16x0.60 (12)	1.03x0.70 (10)	0.93x0.30 (12)	0.83x0.46 (10)	2.00 (R ⁺)	1.00 (R)	1.00 (R)	1.00 (R)
CC-4	1.80x0.36 (14)	1.43x0.50 (14)	0.70x0.30 (15)	1.63x0.80 (14)	2.00 (R ⁺)	2.00 (R ⁺)	1.00 (R)	2.00 (R ⁺)
CC-5	1.53x0.50 (13)	1.91x0.66 (11)	1.40x0.50 (13)	1.26x0.63 (11)	2.00 (R ⁺)	2.00 (R ⁺)	2.00 (R ⁺)	2.00 (R ⁺)
CC-6	2.90x0.93 (14)	2.43x0.70 (14)	1.16x0.60 (13)	2.36x0.80 (14)	4.00 (S)	3.33 (S ['])	2.00 (R ⁺)	4.00 (S)
CC-7	1.93x0.53 (12)	1.63x0.60 (10)	1.16x0.40 (12)	1.60x0.60 (10)	2.00 (R ⁺)	2.00 (R ⁺)	2.00 (R ⁺)	2.00 (R ⁺)
CC-8	3.00x0.93 (11)	0.63x0.43 (11)	2.33x0.63 (11)	2.33x0.80 (11)	4.00 (S)	1.00 (R)	3.00 (S ['])	3.00 (S ['])
CC-9	3.00x1.10 (10)	2.50x0.73 (10)	3.36x0.73 (10)	2.76x0.93 (10)	4.00 (S)	3.33 (S ['])	4.00 (S)	3.00 (S ['])

*Average of 25 fruits; **Figures within parenthesis are incubation period (days)
 R=Resistant; R⁺=Moderately resistant; S[']=Moderately susceptible; S=Susceptible

Vijay. However, isolate CC-6 exhibited susceptible reaction in varieties Sadabahar, Hisar Vijay and Kiran and resistant reaction in Hisar Shakti. The isolates CC-1, CC-2, CC-3, CC-4, CC-5 and CC-7 exhibited resistant reaction in all the four varieties. Attempts have also been made by earlier workers to categorize chilli varieties on the basis of their reaction to different isolates of *C. capsici* (Jeyalakshmi & Seetharaman 1999; Khirbat *et al.* 2004).

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